

REMARKS

Claims 1-2, 4-13, 15 and 20 are currently pending in the application. Claims 1, 13 and 15 have been amended.

Claim Amendments

Claims 1, 13 and 15 have been amended to include the recitation that the foam material has a "gel liquid absorption of at least 4 g/g measured by pore volume distribution." Support for this amendment may be found at least in original claim 3 and on page 16 of the specification. The pore volume distribution may be determined by means of a PVD apparatus manufactured by Textile Research Institute, Princeton, USA.

Chen et al.

Claims 1-2, 4-13, 15 and 20 stand rejected under 35 U.S.C. § 102(e) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over *Chen et al.*, U.S. Patent No. 6,261,679. Applicants respectfully traverse this rejection.

The Office admits that *Chen* is silent about a distribution of pores of sizes between 0 and 3 μ m and silent about the claimed properties of a foam material having an absorption rate at wetting of at least 0.4 ml/s for a round sample having a 50 mm diameter, a liquid distribution capacity at an inclination of 30° of at least 15 g/g, a liquid storage capacity of at least 9% measured through centrifuge retention capacity. The Office asserts that, in the absence of evidence to the contrary, *Chen* teaches essentially the same process of making the absorbent structure as the present invention. Thus, the Office alleges that the claimed properties are either anticipated by *Chen* or at least obvious.

However, applicants, in the form of a declaration from Kent Malmgren, now present evidence of the unexpected results of the presently claimed absorbent material as compared to the material taught by *Chen*. See attached Declaration of Kent Malmgren.

The presently claimed material is a liquid absorbent material comprising an open-cell polymeric foam comprising a polysaccharide or polypeptide. The Office applies the teachings of *Chen* against the presently claimed invention. *Chen* describes a fibrous material, wherein a foam forming material has been added to the

fibrous material to keep the fibers apart and to create an expanded and highly porous fiber structure. The Chen material is defined in embodiments as a "foam-reinforced fibrous network" wherein the components of the structuring composition or foam play a relatively minor structural role in the final absorbent material, once the fibers have been properly positioned and bound. Column 1, line 50 – column 2, line 4. In Chen, the fibers form the walls in the cellular structure, thus having an open-cell foam characteristic. See, Figures 1 and 2.

However, Chen does not teach or suggest an absorbent material that provides the claimed properties. The Chen material, as similar to the state of the art, is not capable of providing satisfactory liquid distribution capacity without sacrificing satisfactory storage capacity. Moreover, the Chen material, also as similar to the state of the art, is not capable of providing satisfactory values for absorption rate, liquid distribution capacity, and storage capacity while also providing satisfactory gel liquid absorption.

As disclosed in the Declaration of Kent Malmgren, the Chen material was carefully reconstructed and tested in accordance with the teachings of Chen. See Declaration of Kent Malmgren, paragraphs 4-7. It was found that the Chen material has the following properties, as compared to the values recited in claim 1:

Sample	Absorption rate (ml/s)	Liquid distribution capacity (g/g)	Storage capacity (%)	Pore volume distribution (g/g)
A	0.49	8.3	12	2.2
B	0.3	10.6	5	1.6
C	0.2	7.1	3	1.7
CLAIM 1	≥ 0.4	≥ 15	≥ 8	≥ 4

See Declaration of Kent Malmgren, paragraph 16.

Unexpectedly, applicants have discovered a liquid absorbent material that is capable of balancing the claimed properties. The art does not teach or suggest such a material. It is an unexpected result to be able to balance liquid distribution capacity and storage capacity at satisfactory levels. More so, it is unexpected to be able to obtain satisfactory values for absorption rate, liquid distribution capacity, and storage capacity while also providing satisfactory gel liquid absorption.

Unexpectedly, the liquid absorbent materials as defined in the claims of the present application are substantially different than those disclosed by Chen and have different properties. Dissimilar to the present invention, Chen proclaims to be focused on a primarily fibrous absorbent structure in contrast to fiber-reinforced foams. Column 1, lines 63-65. The resulting large fibrous structure pore sizes (500 – 7,000 μm) offer relatively little capillary pressure. Column 42, lines 12-16. To remedy the low capillary pressure of the fibrous structure, Chen discloses the use of open cell foam binder in a manner to also increase capillary pressure. Thus, Chen is focused on using foamable binder for the additional purpose of simply storing capillary liquid. Chen does not suggest any other absorbent function for the open cell foam. Therefore, based on the disclosure of Chen, one skilled in the art would not be motivated and is not taught how to incorporate satisfactory gel liquid storage (measured by pore volume distribution) in an absorbent material.

Accordingly, claims 1-2, 4-13, 15 and 20 are, thus, not anticipated or rendered obvious by Chen.

Conclusion

Applicants believe all matters raised in the above referenced Office Action have been responded to and that the application is now in condition for allowance. Should the Examiner have any questions regarding this Amendment, or regarding the application in general, the Examiner is invited to contact the undersigned at the number listed below in order to expedite prosecution of the application.

Respectfully submitted,

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Patent

Attorney's Docket No. 1010315-000092

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)
Kent Malmgren et al.) Group Art Unit: 1771
Application No.: 09/651,130) Examiner: Victor S. Chang
Filed: August 3, 2000) Confirmation No.: 1064
For: Absorbent Foam Material, a Method)
of Producing It and an Absorbent)
Structure Containing Said Foam)
Material)

DECLARATION OF KENT MALMGREN

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Sir:

I, Kent Malmgren, hereby state as follows:

1. I am one of the inventors of the subject matter disclosed and claimed in the above-referenced patent application. My education is Master of Science in Chemical Engineering from the Royal Institute of Technology, Stockholm, Sweden, and I am employed by SCA since 1986. I have mainly been active in research work and my position is research leader in the fiber chemistry area.
2. I have reviewed and am familiar with U.S. Patent No. 6,261,679 of Chen et al. issued July 17, 2001, to Kimberly-Clark Worldwide, Inc. ("Chen").
3. In and around January to March 2006 I conducted experiments to prepare and test materials according to Example 3 of Chen.

Sample Preparation

4. In order to replicate the absorbent material of Example 3 of Chen, carboxymethyl cellulose ("CMC") with the trade name Blanose 74HC, produced by Hercules Inc., was used in these experiments. This CMC grade has an average molecular weight greater than 1000000 and should, according

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to the supplier, be equal to the grade named CMC-TH, which was used in Example 3 in Chen. Eucalyptus fibers were obtained from the Votorantim, Celulose e Papel Company, Brazil and these fibers showed a Canadian Standard Freeness of 570 ml. The pulp was disintegrated according to standard procedures, SCAN method No. C18:65, and then dewatered on a büchner funnel.

5. The consistency of the dewatered pulp was measured and an amount corresponding to 20 grams dry pulp was added to a solution of CMC in distilled water. The mixture, which contained 1.25 g CMC, 20 g eucalyptus fibers and 1000 g distilled water, was then agitated in a Hobart mixer for 2 h at 23°C. The agitated mixture was transferred to a pan and cooled down to about 20°C in a Tefcold freezer, type TFF370. The amount of mixture/ pan area was the same as in Chen, i.e. about 0.78 g/cm². The frozen material was then transferred to an Edwards Modulyo freeze dryer. After freeze-drying, the dry sheet was inspected and it appeared to have low density and high porosity.

6. The freeze-dried material was heat treated at 130°C in a Heraeus oven, type T6120, for 2 h. As in Example 3 of Chen, one section of the material was then further treated at 180°C for 10 minutes. Another section was sprayed on both sides with a Kymene 217 LX solution having 1.1 % solids. Kymene 217 LX is a polyaminoamide-epichlorohydrine resin produced by Hercules Inc. and should, according to the supplier, be equal to Kymene 557-LX, which was used in Chen. The sample had a dry weight of 6.1 g and was sprayed with 30 g of the Kymene solution (15 g on each side). The sprayed sample was then dried and heat-treated in an oven at 105°C for 25 min.

Prepared samples

7. Three absorbent materials according to Example 3 of Chen where prepared:

- A. Treated at 130°C for 2 h
- B. Treated at 130°C for 2h and 180°C for 10 min.
- C. Treated at 130°C for 2h and sprayed with Kymene solution.

Attorney's Docket No. 1010315-000092Measuring methods

8. The prepared samples were examined with two methods described in Chen, Absorption under load (AUL) and Free Swell Capacity. As prescribed in Chen, the test liquid was 0.9 % saline solution.

9. The samples were also tested with the methods used in the present patent application: Absorption rate, Liquid distribution capacity, Storage capacity and Pore volume distribution.

10. Absorption rate was measured as described on page 6, line 15, to page 7, line 23, of the present application.

11. Liquid distribution capacity was measured as described on page 7, line 24, to page 8, line 17, of the present application.

12. Storage capacity was measured as described on page 8, lines 19-27, of the present application.

13. Pore volume distribution was measured as described on page 14, lines 19-26, of the present application.

14. In the tests according to the present application, synthetic urine was used. The synthetic urine was made according to the recipe of 0.66 g/l MgSO₄, 4.47 KCl, 7.6 g/l NaCl, 18.00 g/l NH₂CONH₂ (urea), 3.54 g/l KH₂PO₄, 0.754 g/l Na₂HPO₄, 1 ml/l of a 0.1% solution of Triton X-100, which is a surfactant sold by Aldrich. The substances were dissolved in deionized water.

Results

15. Results of the sample materials prepared according to Example 3 of Chen measured according to the two methods described in Chen are as follows:

Sample	Absorption under load (g/g)	Free Swell Capacity (UNITS)
A	11.7	22.5
B	13.8	23.9
C	13.9	18.7

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16. Results of the sample materials prepared according to Example 3 of Chen measured according to the methods used in the present patent application are as follows:

Sample	Absorption rate (ml/s)	Liquid distribution capacity (g/g)	Storage capacity (%)	Pore volume distribution (g/g)
A	0.49	8.3	12	2.2
B	0.3	10.8	5	1.6
C	0.2	7.1	3	1.7

17. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name: Kent Malmgren Date: 2006-04-07
Kent Malmgren